

REMARKS

I. Claim Objections

In the Office Action, the Examiner has objected to Claims 3 and 9. The Examiner contends that the limitations of Claims 3 and 9 are already stated in Claims 1 and 8 respectively. Applicants have cancelled Claims 3 and 9 without prejudice or disclaimer.

I. Drawings

In the Office Action, the Examiner has objected to the drawings as failing to comply with 37 CFR 1.83(a). The Examiner alleges that the drawings do not show every feature of the invention as specified in the claims. Applicant has amended the drawings as shown in red on the attached sheet of drawings to include the die and the mold compound. Thus, Applicant respectfully submits that the Examiner's objection to the drawings has been effectively traversed. Such action is earnestly solicited.

II. 35 U.S.C. § 103(a)

In the Office Action, the Examiner has rejected Claims 1, 3, and 14 under 35 U.S.C. § 103(a) as allegedly being unpatentable over Yamada et al., U.S. Patent 6,177,725 in view of Huang, U.S. Patent 6,396,139. The Examiner has rejected Claims 4-7 as allegedly being unpatentable over Yamada et al., U.S. Patent

6,177,725 in view of Huang, U.S. Patent 6,396,139, and further in view of Nakamichi, U.S. Patent 6,127,206. The Examiner has rejected Claims 8-9, 11 and 24-25 as allegedly being unpatentable over Yamada et al., U.S. Patent 6,177,725. The Examiner has rejected Claims 10 and 26 as allegedly being unpatentable over Yamada et al., U.S. Patent 6,177,725 in view of Huang, U.S. Patent 6,396,139. The Examiner has rejected Claims 12-13 as allegedly being unpatentable over Yamada et al., U.S. Patent 6,177,725 in view of Nakamichi, U.S. Patent 6,127,206. The Examiner has rejected Claims 8-9, 11, 13-14, and 24-25 as allegedly being unpatentable over Minamio et al., U.S. Patent 6,208,020. Applicant respectfully disagrees.

Applicant claims a unique semiconductor assembly. The semiconductor assembly has a plurality of channels formed on a top surface of a leadframe. The channels are used for promoting adhesion. When a mold compound is used to encapsulate the semiconductor assembly, the mold compound flows into the channels and bonds with the channels forming a lock between the mold compound and the leadframe to prevent delamination of the semiconductor assembly. The semiconductor assembly further has a plurality of raised areas on the leadframe used for wirebonds. The raised areas allow the mold compound to get underneath the wirebonds and capture the wirebonds to increase reliability of the wirebonds.

In contrast, Yamada et al. (hereinafter Yamada) neither discloses nor anticipates a plurality of channels formed on a top

surface of a leadframe. Yamada does not disclose or anticipate channels on the top surface of the leadframe for allowing the mold compound to flow into the channels and bond with the channels in order to form a lock between the mold compound and the leadframe to prevent delamination of the semiconductor assembly. Yamada does show grooves but the grooves are formed on a die pad and not on the entire leadframe as claimed by Applicant. Applicant has a raised area on the leadframe which is used as a die pad. Applicant does not have grooves on the die pad. Furthermore, the grooves in Yamada perform a totally different function. The grooves in Yamada do not prevent delamination of the semiconductor assembly (i.e., between the leadframe and the encapsulant). The groove in Yamada are formed in order to avoid forming a chip mounting area (Column 6, lines 11-13). Furthermore, the grooves in Yamada are used in order to relieve stress to prevent cracks from occurring (see Column 5, lines 58-61). Nowhere is it disclosed or anticipated that the grooves in Yamada are used to prevent delamination of the semiconductor assembly.

To further patentably distinguish Applicant's claimed invention from Yamada, Applicant has a plurality of raised areas on the leadframe. The plurality of raised areas on the leadframe are used for wirebonds. The raised areas allow the mold compound to get underneath the wirebonds and capture the wirebonds to increase reliability of the wirebonds. Yamada fails to disclose or anticipate the plurality of raised areas on the leadframe used for wirebonds. The Examiner contends that Huang discloses the raised

areas. Applicant respectfully disagrees. Huang discloses leads 50b. The leads 50b are exposed to the outside of the encapsulation body. Huang fails to disclose or anticipate raised areas allow the mold compound to get underneath the wirebonds and capture the wirebonds to increase reliability of the wirebonds.

Applicant claims different shaped grooves formed on the top surface of the leadframe. As stated above, the grooves allow the mold compound to flow into the channels and bond with the channels in order to form a lock between the mold compound and the leadframe to prevent delamination of the semiconductor assembly. The Examiner contends that Nakamichi discloses the different shape grooves. Applicant respectfully disagrees. Nakamichi discloses a single groove in each lead not on the entire leadframe. The groove in the lead is used to enhance the reliability and accuracy of optical detection during wirebonding. The groove is used to increase wirebonding strength by extending the bonding area (see column 2, lines 20-27). Nakamichi does not disclose or anticipate using the grooves to allow the mold compound to flow into the channels and bond with the channels in order to form a lock between the mold compound and the leadframe to prevent delamination of the semiconductor assembly.

The Examiner also contends that Minamio et al. Discloses a plurality of "U" shaped channels on the top surface of the leadframe. Applicant respectfully disagrees. Applicant has reviewed Figures 1A-1B and has read the entire patent. Nowhere does Minamio discloses or anticipate using a plurality of "U"

shape grooves to allow the mold compound to flow into the channels and bond with the channels in order to form a lock between the mold compound and the leadframe to prevent delamination of the semiconductor assembly.

Applicant respectfully submits that none of the cited references either alone or in combination with one another disclose or anticipate Applicant's invention as claimed. None of the cited references either alone or in combination with one another disclose or anticipate the use of channels formed on the leadframe for promoting adhesion by allowing the mold compound to flow into the channels and bond with the channels forming a lock between the mold compound and the leadframe to prevent delamination of the semiconductor assembly. The references also fails to disclose or anticipate the plurality of raised areas on the leadframe for wirebonds. The raised areas allowing the mold compound to get underneath the wirebonds and capture the wirebonds to increase reliability of the wirebonds. Thus, Applicant respectfully submits that the Examiner's rejections of the Claims under 35 U.S.C. § 103(a) has been effectively traversed. Such action is earnestly solicited.

Applicant would further like to add that the legal standard for obviousness under 35 U.S.C. 103 has been the subject of much analysis. The Federal Circuit has enunciated several guidelines in making a Sec. 103 obviousness determination.

A prima facie case of obviousness is established when the teachings from the prior art itself would appear to have suggested the claimed subject matter to a person of ordinary skill in the art.

In re Bell, 991 F.2d 781, 783, 26 U.S.P.Q.2d 1529, 1531 (Fed Cir. 1993) (quoting In re Rinehart, 531 F.2d 1048, 1051 (C.C.P.A. 1976)).

{T}he examiner bears the burden of establishing a prima facie case of obviousness based upon the prior art. "{The Examiner} can satisfy this burden only by showing some objective teaching in the prior art or that knowledge generally available to one of ordinary skill in the art would lead that individual to combine the relevant teachings of the references." (Emphasis added)

In re Fritch, 972 F.2d 1260, 1265, 23 U.S.P.Q.2d 1780, 1783 (Fed Cir. 1992) (citing In re Piasecki, 745 F.2d 1468, 1471-72, 223 U.S.P.Q. 785, 787-88 (Fed. Cir. 1984) and In re Fine, 837 F.2d 1071, 1074, 5 U.S.P.Q.2d 1596, 1598 (Fed. Cir. 1988) (citing In re Lalu, 747 F.2d 703, 705, 223 U.S.P.Q. 1257, 1258 (Fed. Cir. 1988))).

For the Examiner to establish a prima facie case of obviousness, the Examiner must contend that the teachings from the prior art itself or that knowledge generally available to one of ordinary skill in the art would appear to suggest the claimed subject matter to a person of ordinary skill in the art.

Perhaps the Examiner somehow believes that one of ordinary skill in the art could conceivably combine the cited references to produce Applicants' claimed invention. But the Federal Circuit has held that

obviousness cannot be established by combining the teachings of the prior art to produce the claimed invention, absent some teaching or suggestion supporting the combination. (Emphasis added)

In re Bell, 991 F.2d 781, 783, 26 U.S.P.Q.2d 1529, 1531 (Fed. Cir. 1993) (citations omitted).

Obviousness is tested by "what the combined teachings of the references would have suggested to those of ordinary skill in the art." (Emphasis added) But it "cannot be established by combining the teachings of the prior art to produce the claimed invention, absent some teaching or suggestion supporting the combination." (Emphasis added)

In re Fine, 837 F.2d 1071, 1075, 5 U.S.P.Q.2d 1596, 1599 (Fed. Cir. 1988) (citing In re Keller, 642 F.2d 413, 425, 208 U.S.P.Q.871, 881 (C.C.P.A. 1981) and ACS Hosp. Sys. v. Montefiore Hosp., 732 F.2d 1572, 1577, 221 U.S.P.Q. 929, 933 (Fed. Cir. 1984)).

Something in the prior art as a whole must suggest the desirability, and thus the obviousness, of making the combination.

Uniroyal, Inc. v. Rudkin-Wiley Corp., 837 F.2d 1044, 1051, 5 U.S.P.Q.2d 1434, 1438 (Fed. Cir. 1988) (citing Lindemann, Maschinenfabrik GmbH v. American Hoist and Derrick Co., 730 F.2d 1452, 1462, 221 U.S.P.Q. 481, 488 (Fed. Cir. 1984)).

Applicant respectfully yet strenuously contends that the Examiner has shown no teaching nor suggestion in any one or more of the cited references or elsewhere of Applicant's claimed apparatus to support a conclusion of obviousness.

By maintaining the multiple reference combination obviousness rejection, the Examiner has fallen into the common trap of hindsight reconstruction, which has been frequently denounced by the Federal Circuit as inappropriate to support a finding of obviousness.

The obviousness standard, while easy to expound, is sometimes difficult to apply. It requires the decisionmaker to return to the time the invention was made. "the invention must be viewed not with the blueprint drawn by the inventor, but in the state of the art that existed at the time."

Uniroyal, Inc. v. Rudkin-Wiley Corp., 837 F.2d 1044, 1050-51, 5 U.S.P.Q.2d 1434 (Fed. Cir. 1988) (quoting Interconnect Planning Corp. v. Feil, 774 F.2d 1132, 1138, 227 U.S.P.Q. 543, 547-548 (Fed. Cir. 1985)).

It is clear from the Examiner's rejection that, absent the "blueprint" of Applicants' disclosure, the prior art has no suggestion or teaching of Applicants' claimed invention. The Federal Circuit has also stated:

It is improper to use the patent as an instruction manual to lead to elements of the prior art.

Panduit Corp. v. Dennison Mfg. Co., 810 F.2d 1561, 1568 (Fed. Cir. 1987).

It is impermissible to use the claimed invention as an instruction manual or "template" to piece together the teachings of the prior art so that the claimed invention is rendered obvious.

In re Fritch, 972 F.2d 1260, 1266, 23 U.S.P.Q.2d 1780, 1784 (Fed. Cir. 1992) (citing In re Gorman, 933 F.2d 982, 987, 18 U.S.P.Q.2d 1885, 188 (Fed. Cir. 1991)).

It is very clear from the Examiner's language that Applicant's claimed invention is only rendered invalid for obviousness if the Applicant's claimed invention is used as an instruction manual, or template, for modifying the cited prior art. Absent the knowledge gleaned from Applicant's disclosure, there is no suggestion or teaching in the cited prior art or in the general knowledge in the art to support the Examiner's assertion that Applicant's claimed invention would have been obviousness to one of ordinary skill in the art. The Federal Circuit has also stated:

When prior art references require selective combination...to render obvious a subsequent invention, there must be some reason for the combination other than the hindsight gleaned from the invention itself.

Uniroyal, Inc. v. Rudkin-Wiley Corp., 837 F.2d 1044, 1051, 5 U.S.P.Q.2d 1434, 1438 (Fed.a Cir. 1988) (citing Interconnect Planning Corp. v. Feil, 774 F.2d 1132, 1143, 227 U.S.P.Q. 543, 551 (Fed. Cir. 1985)).

The Examiner has cited no reason for modifying the cited references to allegedly achieve Applicant's claimed invention other than the knowledge gleaned from Applicant's disclosure. For this reason the Examiner has failed to establish a prima facie case of obviousness based on a combination of these specific references.

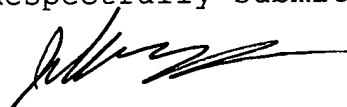
Applicant respectfully submit that Applicant's claimed invention is deserving of patent protection because it describes a useful and functioning apparatus and method which is patentably distinguishable over the prior art.

In conclusion, Applicant respectfully submit that this Amendment Letter, including the amendments to the Claims, and in view of the Remarks offered in conjunction therewith, are fully responsive to all aspects of the objections and rejections tendered by the Examiner in the Office Action. Applicant respectfully submits that he has persuasively demonstrated that the above-identified Patent Application, including Claims 1, 4-8, 10-14, and 24-28 are in condition for allowance. Such action is earnestly solicited.

If the foregoing does not place the case in condition for immediate allowance, the Examiner is respectfully requested to contact the undersigned for purposes of a telephone interview.

If there are any fees incurred by this Amendment Letter,
please deduct them from our Deposit Account NO. 23-0830.

Respectfully submitted,



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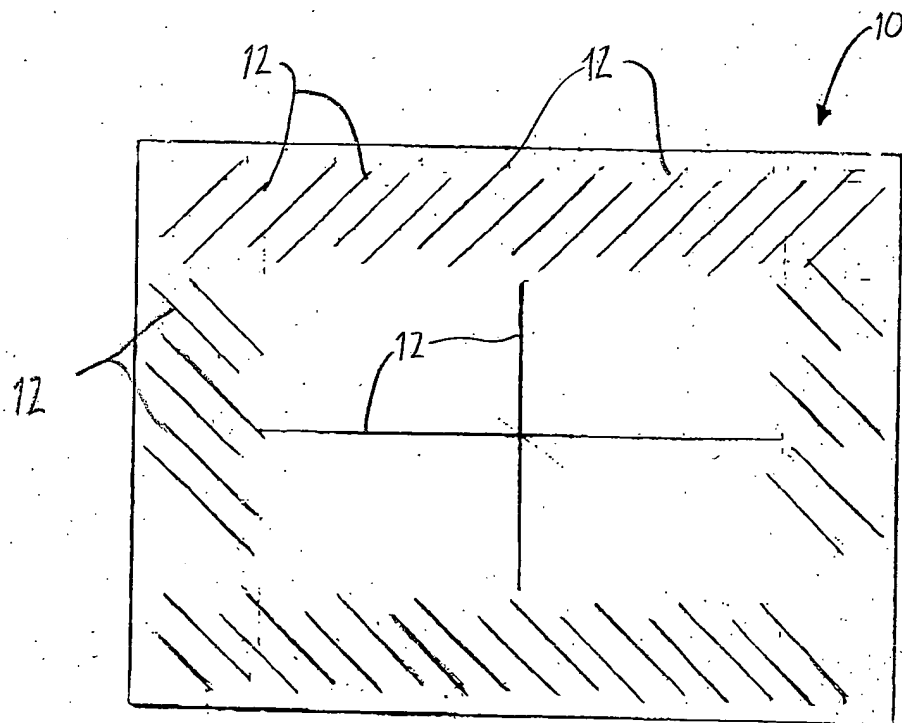


FIG. 3

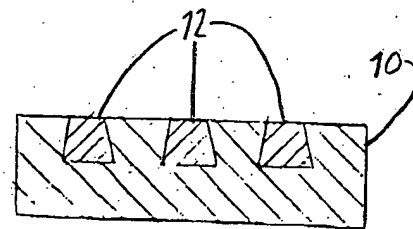


FIG. 3A

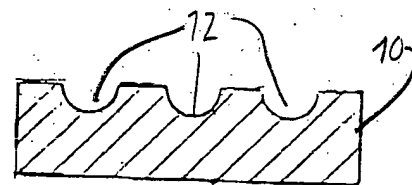


FIG. 3B

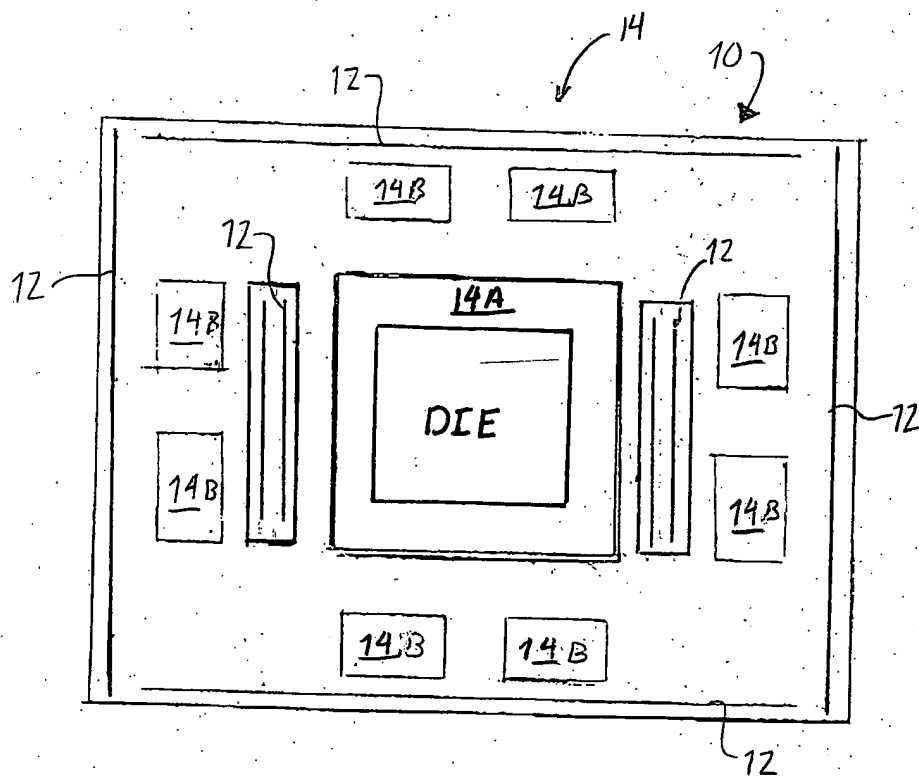


FIG. 4

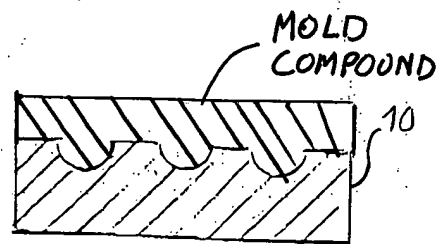


FIG. 4A